

CLAIMS:

1. A light receiving and emitting probe comprising:

a conductive nanotube probe needle with a base end portion thereof fastened to a holder and a tip end portion thereof protruded;

a light receiving and emitting body provided on a circumferential surface of said conductive nanotube probe needle;

a conductive nanotube lead wire fastened to said light receiving and emitting body, wherein light is received and emitted by means of said light receiving and emitting body.

2. A light receiving and emitting probe comprising:

a conductive nanotube probe needle with a base end portion thereof fastened to a holder and a tip end portion thereof protruded,

a light receiving and emitting body provided on a circumferential surface of said conductive nanotube probe needle,

a conductive nanotube lead wire fastened to said light receiving and emitting body, and

a means for applying an electric voltage between both ends of said conductive nanotube lead wire and said conductive nanotube probe needle, wherein

light is received and emitted by means of said light receiving and emitting body.

3. The light receiving and emitting probe according to Claim 2, wherein:

an AFM cantilever in which a protruding portion used as said holder is formed on a cantilever portion thereof is employed,

two electrode films are provided on said cantilever portion,

one end of said conductive nanotube lead wire is connected to one of said electrode films, and

said conductive nanotube probe needle is connected to another of said electrode films, wherein

an electric voltage is applied between said electrode films.

4. The light receiving and emitting probe according to Claim 2, wherein:

an AFM cantilever in which a protruding portion used as said holder is formed on a cantilever portion thereof is employed,

two electrode films are provided on said cantilever portion,

one end of said conductive nanotube lead wire is connected to one of said electrode films, and

said conductive nanotube probe needle and another of said electrode films are connected by means of another conductive nanotube lead wire, wherein

an electric voltage is applied between said electrode films.

5. A light receiving and emitting probe comprising:

an AFM cantilever which has a protruding portion provided on a cantilever portion thereof,

two electrode films provided on said cantilever portion, and

a light receiving and emitting body formed near a tip end of said protruding portion, wherein

both ends of said light receiving and emitting body and said two electrode films are made electrically continuous, and said light receiving and emitting body is caused to receive and emit light by causing an electric current to pass between said two electrode films.

6. A light receiving and emitting probe apparatus comprising:

said light receiving and emitting probe according to Claim 2, 3, 4, or 5,

a scanning mechanism that operates said light receiving and emitting probe to scan over a sample, and

a control circuit that causes light to be received and emitted by a light receiving and emitting body provided on said light receiving and emitting probe.